



Hardware Installation Guide

V2.0.0

31 March 2008

Legal notice

For customers in the U.S.A.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However there is no guarantee that interferences will not occur in a particular installation. If the equipment does cause harmful interference to radio or television reception, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the distance between the equipment and the receiver.
- Use a different line outlet for the receiver.
- Consult a radio or TV technician for help.

You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment. The shielded interface cable recommended in this manual must be used with this equipment in order to comply with the limits for a computing device pursuant to Subpart B of Part 15 of FCC Rules.

For customers in Canada

This apparatus complies with the Class B limits for radio noise emissions set out in the Radio Interference Regulations.

Pour utilisateurs au Canada

Cet appareil est conforme aux normes classe B pour bruits radioélectriques, spécifiées dans le Règlement sur le brouillage radioélectrique.

Life support applications

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Allied customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Allied for any damages resulting from such improper use or sale.

Trademarks

Unless stated otherwise, all trademarks appearing in this document of Allied Vision Technologies are brands protected by law.

Warranty

The information provided by Allied Vision Technologies is supplied without any guarantees or warranty whatsoever, be it specific or implicit. Also excluded are all implicit warranties concerning the negotiability, the suitability for specific applications or the non-breaking of laws and patents. Even if we assume that the information supplied to us is accurate, errors and inaccuracy may still occur.

Copyright

All texts, pictures and graphics are protected by copyright and other laws protecting intellectual property. It is not permitted to copy or modify them for trade use or transfer, nor may they be used on web sites.

Allied Vision Technologies GmbH 03/2008

All rights reserved.

Managing Director: Mr. Frank Grube

Tax ID: DE 184383113

Support:

Taschenweg 2A

D-07646 Stadtroda, Germany

Tel.: +49 (0)36428 6770

Fax: +49 (0)36428 677-28

e-mail: info@alliedvisiontec.com

Contents

Contacting Allied Vision Technologies	5
Introduction	6
Document history	6
Manual overview.....	6
Conventions used in this manual.....	7
Styles	7
Symbols	8
More information.....	8
AVT accessories.....	8
AVT software	9
AVT Technical Manuals	10
Safety instructions	11
General safety instructions.....	11
FireWire safety instructions.....	12
FireWire hot-plug and screw-lock precautions	12
Changing filters safety instructions	12
GUPPY: changing filters safety instructions	13
PIKE/OSCAR: changing filters safety instructions.....	13
MARLIN: changing filters safety instructions	14
Cautions: Connecting a camera	14
PIKE/STINGRAY GOF connectors.....	15
PIKE/STINGRAY voltages.....	15
GUPPY voltages.....	15
MARLIN/OSCAR voltages.....	16
DOLPHIN voltages	16
Safety instructions for board level cameras.....	18
AVT camera cleaning instructions	20
Warranty	20
Avoiding the necessity of camera cleaning	21
Is it an impurity? – Identifying impurities.....	22
Where is the impurity? – Locating impurities	22
Cleaning Instructions	24
AVT cameras: installing hardware	27
Hardware conditions	28
FireWire hot-plug and screw-lock precautions	29
Overview hardware installation	30
Installing IEEE 1394 adapter	30
Connecting camera to PC or laptop.....	31

Camera interfaces	32
IEEE 1394a port pin assignment	
(DOLPHIN, OSCAR, MARLIN, GUPPY).....	35
Board level camera: IEEE 1394a port pin assignment	36
IEEE 1394b port pin assignment	
(PIKE, STINGRAY)	37
PIKE/STINGRAY fiber infos and cautions.....	38
Camera I/O pin assignment (8 pin) (GUPPY)	40
Board level camera (Guppy): I/O pin assignment.....	41
Camera I/O connector pin assignment (12 pin): DOLPHIN, OSCAR, MARLIN, PIKE, STINGRAY	42
DOLPHIN family	43
OSCAR and MARLIN family	44
PIKE and STINGRAY family	45
Operating the camera (DOLPHIN, OSCAR, MARLIN, GUPPY, PIKE, STINGRAY).....	46
Control and video data signals.....	46
Inputs (DOLPHIN, OSCAR, MARLIN, GUPPY, PIKE, STINGRAY).....	47
Triggers.....	52
Outputs DOLPHIN	53
Outputs OSCAR/MARLIN.....	55
Outputs GUPPY.....	56
Outputs PIKE	57
Outputs STINGRAY	59
Firmware update	61
Index	62

Contacting Allied Vision Technologies

Info



- **Technical information:**
support@alliedvisiontec.com
phone (for Germany): +49 (0)36428 677-270
phone (for USA): +1 978-225-2030
outside Germany/USA: Please check the link for your local dealer.
<http://www.alliedvisiontec.com/partner.html>
- **Ordering and commercial information:**
customer-care@alliedvisiontec.com
phone (for Germany): +49 (0)36428 677-230
phone (for USA): +1 978-225-2030
outside Germany/USA: Please check the link for your local dealer.
<http://www.alliedvisiontec.com/partner.html>
Please note order number/text given in the **AVT Modular Camera Concept**.

Introduction

This **Hardware Installation Guide** describes the hardware installation procedures for all 1394 AVT cameras (Dolphin, Oscar, Marlin, Guppy, Pike, Stingray).

The **Hardware Installation Guide** answers questions about putting AVT cameras into operation, about safety warnings, pin assignments on I/O connectors and 1394a/b connectors. Learn how to get more information at the AVT website (accessories), how to get information about software applicable with AVT cameras and how to get deep information from the Technical Manual of each camera family.

Note



Please read through this manual carefully before installing the hardware on your PC or laptop (FireWire card, cables) and operating the AVT cameras.

Document history

Version	Date	Remarks
V2.0.0	31.03.08 tbd	New Manual - RELEASE status

Table 1: Document history

Manual overview

The manual overview describes each chapter of this manual shortly.

- Chapter [Contacting Allied Vision Technologies](#) on page 5 lists AVT contact data for both: technical information / ordering and commercial information.
- Chapter [Introduction](#) on page 6 (this chapter) gives you the document history, a manual overview and conventions used in this manual (styles and symbols). Furthermore you learn how to get more information on **AVT accessories**, available **AVT software** and the **AVT Technical Manuals**.
- Chapter [Safety instructions](#) on page 11 describes safety instructions for AVT cameras in general and special safety instructions for camera families/models.
 - **Read this chapter carefully before operating any AVT camera.**

- Follow all safety instructions, especially the cautions when connecting cameras.
- Take special care when operating board level cameras (Caution-ESD, general warnings, loading and dirty environments). Read all notes and safety instructions before operating any AVT board level camera.
- Chapter [AVT cameras: installing hardware](#) on page 27 describes the hardware installation procedures. In this chapter you get links to the AVT website (accessories) and you learn how to get more information on installing software.
 - Read this chapter before installing any hardware.
 - Read and follow the FireWire hot plug precautions.
 - Read and follow the caution when connecting a camera to PC or laptop.
- Chapter [Camera interfaces](#) on page 32 describes the interfaces of all AVT cameras (I/O connector and IEEE 1394a and 1394b connectors).
 - Read all notes and cautions carefully.
- Chapter [Firmware update](#) on page 61 describes how to get information on firmware updates.

Conventions used in this manual

To give this manual an easily understood layout and to emphasize important information, the following typographical styles and symbols are used:

Styles

Style	Function	Example
Bold	Programs, inputs or highlighting important things	bold
Courier	Code listings etc.	Input
Upper case	Register	REGISTER
Italics	Modes, fields	<i>Mode</i>
Parentheses and/or blue	Links	(Link)

Table 2: Styles

Symbols

Note This symbol highlights important information.



Caution This symbol highlights important instructions. You have to follow these instructions to avoid malfunctions.



Caution-ESD This symbol highlights important ESD instructions. Only **qualified personnel** is allowed to install and operate components marked with this symbol.



www This symbol highlights URLs for further information. The URL itself is shown in blue.



Example:

<http://www.alliedvisiontec.com>

More information

In this chapter you get more information on **AVT accessories**, available **AVT software** and the **AVT Technical Manuals**.

AVT accessories

Note Allied Vision Technologies offers a wide range of **accessories** for the use of AVT Cameras and the easy integration in already existing applications.



- **IEEE 1394a** accessories (interface cards, hubs and repeaters, cables)
- **IEEE 1394b** accessories (interface cards, hubs and repeaters, cables)
- **Lenses** (for cameras with sensors of type 1/3, 1/2, 1, 2/3 and 1.2)

www

For **more information on accessories** go to:

www.alliedvisiontec.com/avt-products/accessories.html

To **order accessories online** visit the **AVT web shop** at:

<http://shop.avt-cameras.com/avtshop.html>

AVT software

Note

AVT cameras are **compliant to IIDC V1.30/V1.31**. Moreover AVT cameras offer many more functions than specified in the IIDC V1.30/V1.31: so-called AVT SmartFeatures. These features are accessible via direct register access, or by using special functions provided in the following **AVT Software Packages**:

- AVT FirePackage
- AVT Direct FirePackage (DirectShow, WDM)
- AVT Fire4Linux

All software packages provided by AVT are **free of charge** and contain the following components:

- Drivers
- Software Development Kit (SDK) for camera control and image acquisition
- Examples based on the provided APIs of the SDK
- Documentation and release notes
- Viewer application to operate/configure the cameras and access/test the **AVT SmartFeatures**.

www

All software packages (including documentation and release notes) provided by AVT can be downloaded at:

www.alliedvisiontec.com/avt-products/software.html

All software packages are also on AVT's product CD.

www

In addition to the AVT Software Packages Allied Vision Technologies offers special **Integration Packages** to integrate AVT cameras into any third-party vision software that supports the IIDC standard.

For more information read the **Software Package Selector Guide**.

Go to:

www.alliedvisiontec.com/avt-products/software.html

Here you also find the **AVT Software Packages for download** and **additional software documentation**:

- FirePackage User Guide
- FirePackage64 User Guide
- [tbd: Fire4Linux User Guide]
- [tbd: Command Reference Guide]
- Release Notes
- Operating AVT cameras with SmartView

AVT Technical Manuals

Note

Besides hardware installation procedures (this guide) and the software documentation there is an in-depth description of all AVT cameras in the so-called **Technical Manuals** (one for each AVT camera family):

- DOLPHIN Technical Manual
- OSCAR Technical Manual
- MARLIN Technical Manual
- GUPPY Technical Manual
- PIKE Technical Manual
- STINGRAY Technical Manual

Here you find: technical data, functional descriptions, features of the camera and how to use, register descriptions (IIDC V1.30/V1.31 and AVT advanced registers)

www

For **downloading the Technical Manuals** go to:

www.alliedvisiontec.com/downloads/avt-cameras.html

Safety instructions

This chapter describes safety instructions/cautions valid for all AVT camera families and special safety instructions/cautions depending on the camera family/model used.

General safety instructions

Note



- There are no switches or parts inside the camera that require adjustment. The guarantee becomes void upon opening the camera casing.
- If the product is disassembled, reworked or repaired by other than a recommended service person, AVT or its suppliers will take no responsibility for the subsequent performance or quality of the camera.
- The camera does **not** generate dangerous voltages internally. However, because the IEEE 1394a and 1394b standard permit cable power distribution at voltages higher than 24 V, **please note that various country-specific regulations apply.**

Note



- All **color models** are equipped with an **optical filter** to eliminate the influence of infrared light hitting the sensor. Please be advised that, as a side effect, this filter reduces sensitivity in the visible spectrum. The optical filter is part of the back focus ring, which is threaded into the C-Mount.
- **B/w models** are delivered with a **sensor protection glass** mounted in the back focus ring to ensure maximum sensitivity. In certain applications and depending on the lighting source and optics, the use of either IR blocking or IR passing filter may be required to improve the image quality.

FireWire safety instructions

FireWire hot-plug and screw-lock precautions

Caution



Hot-plug precautions

- Although FireWire devices can **theoretically** be hot-plugged without powering down equipment, **we strongly recommend turning the computer power off, before connecting a digital camera** to it via a FireWire cable.
- **Static electricity or slight plug misalignment during insertion may short-circuit and damage components.**
- The physical ports **may be damaged** by **excessive ESD** (electrostatic discharge), when connected under powered conditions. It is good practice to ensure proper grounding of computer case and camera case to the same ground potential, before plugging the camera cable into the port of the computer. This ensures that no excessive difference of electrical potential exists between computer and camera.

Screw-lock precautions

- Also, all AVT 1394b camera and cables have **industrial screw-lock fasteners**, to insure a tight electrical connection that is resistant to vibration and gravity.
- **We strongly recommend using only 1394b adapter cards with screw-locks.**

Changing filters safety instructions

Caution



- Mount/dismount lenses and filters in a **dust-free environment**, and **do not** use compressed air (which can push dust into cameras and lenses).
- Use only **optical quality tissue**/cloth if you must clean a lens or filter.

Ask your dealer if you are not familiar with these procedures.

GUPPY: changing filters safety instructions

Old CS-/C-Mounting	New CS-/C-Mounting starting with serial no. 06/05-84312215
<p>CS-Mount models have the filter or protection glass mounted directly in front of the sensor. Taking out the filter or protection glass is not possible at customer site.</p> <p>Ask your dealer for a camera with the respective filter already installed.</p>	<p>All models have the filter or protection glass mounted directly in the CS-Mount adapter. (Standard delivery is a CS-Mount camera). Taking out the filter or protection glass is not possible at customer site.</p> <p>Ask your dealer for a camera with the respective filter already installed.</p>
<p>C-Mount models have the filter or protection glass mounted in the CS- to C-Mount extension adapter.</p> <p>Ask your dealer for an extension adapter with the intended filter already mounted.</p>	<p>In order to get a C-Mount camera, screw the 5 mm C-Mount adapter onto the CS-Mount camera.</p> <p>Unscrew the 5 mm C-Mount adapter to get again a CS-Mount camera.</p>
<p>Removing the C-Mount adapter opens the front section of the camera. This greatly enhances the risk for dust or particles to migrate on the sensor's protection glass.</p> <p>In order to remove the adapter:</p> <p>Hold the camera so that the adapter points downwards while changing the adapter. Use optical cleaning tissues for cleaning the sensor's protection glass if needed. Never use compressed air for cleaning purposes.</p> <p>Ask your dealer if you are not familiar with these procedures.</p>	<p>Removing the CS-Mount adapter opens the front section of the camera. This greatly enhances the risk for dust or particles to migrate on the sensor's protection glass.</p> <p>In order to remove the adapter:</p> <p>Hold the camera so that the adapter points downwards while changing the adapter. Use optical cleaning tissues for cleaning the sensor's protection glass if needed. Never use compressed air for cleaning purposes.</p> <p>Ask your dealer if you are not familiar with these procedures.</p>

Table 3: Old and new CS-/C-Mounting of GUPPY cameras

PIKE/OSCAR: changing filters safety instructions

Note



- **Pike/Oscar** models only: **Changing filters** is achieved by changing back focus rings with the appropriate filter already mounted. Please be advised that back focus adjustment will be necessary in order to match C-Mount distance of 17.526 mm. Ask your dealer for further information or assistance.

MARLIN: changing filters safety instructions

Note



- For certain applications it may be recommended to take out the filter by means of a special tool which can be ordered from AVT under the following number: E9020001.
- Taking out the filter requires special care. Ask your dealer to help you if you are not confident with the procedure.

Cautions: Connecting a camera

Caution



ALL CAMERAS

- **Do not touch the shield of the camera cable** connected to a computer and the ground terminal of the lines at the same time.
- **Use only DC power supplies with insulated cases.** These are identified by having only **two** power connectors.
- Although IEEE 1394a and 1394b are functionally plug and play, the physical ports **may be damaged by excessive ESD** (electrostatic discharge), when connected under powered conditions. It is good practice to ensure proper grounding of computer case and camera case to the same ground potential, before plugging the camera cable into the port of the computer. This ensures that no excessive difference of electrical potential exists between computer and camera.
- If you feel uncomfortable with the previous advice or if you have no knowledge about the connectivity of an installation, **we strongly recommend powering down all systems before connecting or disconnecting a camera.**

PIKE/STINGRAY GOF connectors

Caution



Special warning for all PIKE/STINGRAY models with GOF connectors:

GOF connectors are very sensitive. **Any dust or dirt may cause damage.**

- Always keep the GOF connector and optical fiber plug clean.
- If GOF connection is not in use, keep GOF dust cover on the GOF connector.
- Reduce mating cycles to a minimum to prevent abrasion.
- Please note that optical fiber cables have a very limited deflection curve radius.

PIKE/STINGRAY voltages

The inputs can be connected directly to +5 V. If a higher voltage is used, an external resistor must be placed in series. Use at +12 V a 820 Ω resistor and at +24 V a 2.2 k Ω resistor.

Caution



PIKE/STINGRAY

Voltages above +45 V may damage the optical coupler.

GUPPY voltages

Caution



GUPPY

If using voltages higher than + 5 V the input of the camera will be damaged.

To avoid damage of the input, **use an external resistor in series (outside of the camera).**

Recommendations for resistors by voltages higher than + 5 V:

- Use at +12 V a 18 k Ω resistor.
- Use at +24 V a 47 k Ω resistor.

For details see [Figure 1: Input block diagram \(GUPPY\)](#) on page 16.

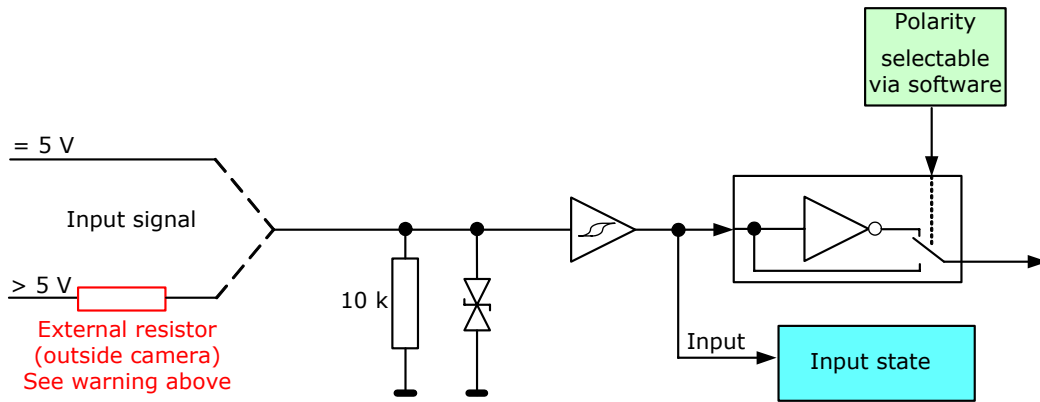


Figure 1: Input block diagram (GUPPY)

Caution



GUPPY

The Guppy outputs are **not short-circuit-proof**.
If there occurs a short-circuit at the outputs, the **output driver will be damaged**.

MARLIN/OSCAR voltages

The inputs can be connected directly to +5 V. If a higher voltage is used, an external resistor must be placed in series. Use @+12 V a 820 Ω and @+24 V a 2.2 kΩ resistor.

Caution



Voltages above +45 V may damage the optical coupler.

DOLPHIN voltages

The inputs can be connected directly to +5 V. If a higher voltage is used, an external resistor must be placed in series. Use @+12 V a 470 Ω and @+24 V a 1.2 kΩ resistor.

Caution Voltages above +45 V may damage the optical coupler.



Safety instructions for board level cameras

Note

Read the Guppy Technical Manual and this safety instructions before use.



Abuse or misapplication of the camera may result in limited warranty or cancelation of warranty.

Caution-ESD

Board level cameras: ESD warnings



- Only **qualified personnel** is allowed to install and operate the Board level cameras.
- Board level cameras are delivered without housing. Handle the sensor board and main board with care. Do not bend the boards. Do not touch the components or contacts on a board. Hold a board by its edges.
- Sensor board and main board are sensitive to electrostatic discharge. To avoid possible damage, handle all static-sensitive boards and components in a static-safe work area. Follow the procedures below.
- ESD (electrostatic discharge): Static electricity can damage the sensor board or the main board of your Board level cameras. To prevent static damage, discharge static electricity from your body before you touch any of your Board level camera's electronic components, such as sensor board or main board. To do so, use a static-safe work area with static-dissipative mat and wear a static-dissipative wrist strap. Do not hold any components of your Board level camera against your clothing. Even if you are wearing a wrist strap, your body is grounded but your clothes are not.
- Do not remove the sensor board and main board from its anti-static packaging unless your body is grounded.
- **ESD shielding:** To protect the boards from radiation of other modules or devices use a special ESD protective housing.

Caution**Board level cameras: General Warnings**

- Be sure that all power to your board level cameras is switched off, before mounting the sensor board or making connections to the camera.
- Do not connect or disconnect any cables during an electrical storm.
- Do not use your board level cameras during an electrical storm.
- To help avoid possible damage to the sensor board or main board, wait 5 seconds after power is switched off, before connecting or disconnecting any cable to the board level cameras.
- Ensure that nothing rests on the cables of your board level cameras.
- Keep your board level cameras away from radiators and heat sources.
- Do not spill food or liquids on your board level cameras.

Caution**Board level cameras: Loading**

- Avoid any mechanical forces to the board level cameras, the boards and its components, especially torsional, tensile and compressive forces. Any of these forces may result in damage of the board level cameras, the boards and its components.
- To avoid damages of the boards, provide cables with an external pull relief so that no force is applied to the connectors itself.

Caution**Board level cameras: Dirty environments**

- Always use clean boards.
- To protect the boards from dirt like dust, liquids or swarf always use the board level cameras only in clean room environment or use a protective housing.

AVT camera cleaning instructions

This section describes safety instructions/cautions valid for all AVT camera families in case of cleaning lenses, optical filters/protection glass or sensors.

Note



- Please read these instructions before you contact your AVT camera dealer for assistance.
- Ask your AVT camera dealer if you are not familiar with the procedures described below.

Warranty

Caution



Warranty precautions

- To ensure your warranty remains in force:
 - Do not open the camera housing.
 - Follow instructions described below.
 - Use only optical quality tissue/cloth if you must clean a lens or filter.
 - Use only optics cleaner (60% ethyl alcohol, 40% ether). Never use aggressive cleaners like benzine or spirit. Such cleaners may destroy the surface.
 - **Do not use compressed air which can push dust into camera and lens.**
- AVT does not warranty against any physical damage to the sensor/filter/protection glass or lenses caused by the user during the cleaning process.

Caution



General warnings

- Do not touch any optical component with bare fingers. Oil or other impurities may damage the surface.
- Only follow the processes described below if you are familiar with these procedures and if you have the necessary equipment.
- If you are uncomfortable with the outlined precautions, please return your camera to AVT for cleaning.

Caution-ESD ESD warnings

Image sensors are easily damaged by static discharge (ESD).

- Please use anti-static gloves, clothes and materials. Also use conductive shoes.
- Install a conductive mat on the floor and/or working table to prevent the generation of static electricity.

Avoiding the necessity of camera cleaning

When changing camera lenses please follow these procedures:

- Simply hold the camera with the C-mount opening towards the floor, when removing the dust-cap or changing the lens:



Figure 2: Hold camera like this while changing the lens/removing the dust cap of a camera

- Thread the lens onto the camera while holding the camera in this position. This will minimize the possibility of any contaminants falling on the glass surface.
- Always store cameras and lenses with dust-caps installed.

Is it an impurity? – Identifying impurities

If you observe any image artefacts in your video preview of your AVT camera you may have impurities either on the lens, filter/protection glass or, theoretically on the sensor protection glass, although every AVT camera gets cleaned prior to sealing and shipment.

Impurities (dust, particles or fluids) on the sensor or optical components (Figure 3: Image with tiny dust on the filter (left) and dust on the sensor (right) on page 22) will appear as a dark area, patch or spot on the image and will remain fixed in the preview window while you rotate the camera over the target.

Do not confuse this with a pixel defect which will appear as a distinct point. It is crucial to differentiate between dust (e.g. flakes of skin, particles) and other dirt (e.g. liquids, fingerprints, grease). Particles can either rest loosely or can be more or less stuck to the optical surface.

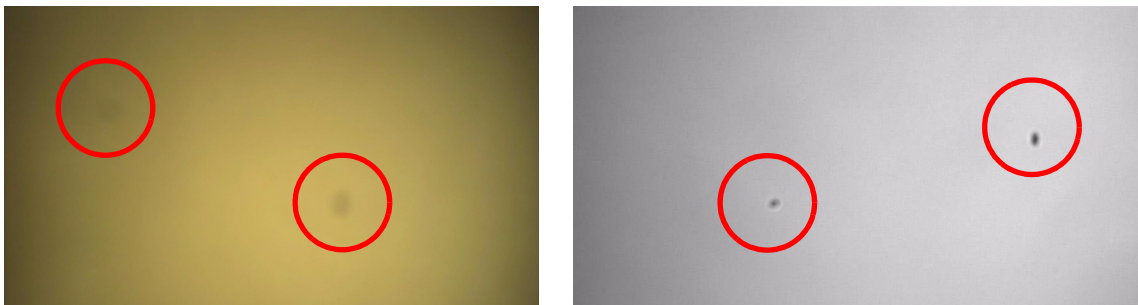


Figure 3: Image with tiny dust on the filter (left) and dust on the sensor (right)

Where is the impurity? – Locating impurities

Before you dismantle the lens you should find out if the impurity is on the filter, lens or sensor. Therefore you should view a uniform image (e.g. a white sheet of paper) with the camera. The affected optical surface is identified when a suspected optical component is moved and the dirt follows this movement.

1. If you move only the lens (not the camera) and the impurity moves as well, the impurity is on the lens.
2. If you move the IR cut filter/protection glass window and the impurity moves as well:

Please carefully remove the filter/protection glass (for certain camera models, indicated below, requiring a special tool which can be ordered

under the following number: E9020001) and clean it on both sides using the techniques explained below.

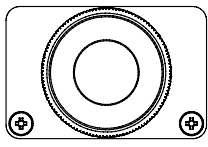
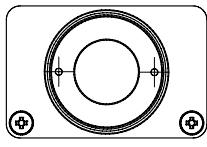
Camera type	Tool to be used	Description
Dolphin	AVT order number E9020001	Figure 4: Removing IR cut filter/protection glass using special tool (E902001) on page 24
Oscar	1.3 mm hex key (Allen key) AVT order number K 9020411	Loosen both countersunk screws. Remove chromatic flange: Take care, C-Mount adjustment spacers may fall out. Put them back carefully on chromatic flange and screw chromatic flange with adjustment spacers in camera.
Marlin	AVT order number E9020001	Figure 4: Removing IR cut filter/protection glass using special tool (E902001) on page 24
Guppy	Pliers and leather	Carefully unscrew the knurled ring.
Pike	1.3 mm hex key (Allen key) AVT order number K 9020411	Loosen both countersunk screws. Remove chromatic flange: Take care, C-Mount adjustment spacers may fall out. Put them back carefully on chromatic flange and screw chromatic flange with adjustment spacers in camera.
Stingray	<ul style="list-style-type: none"> Stingray cameras Rev. 1: see Guppy Stingray cameras Rev. 2: AVT order number E9020001 	<ul style="list-style-type: none"> Stingray cameras Rev. 1: see Guppy Stingray cameras Rev. 2: Figure 4: Removing IR cut filter/protection glass using special tool (E902001) on page 24 <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>Stingray Rev. 1</p> </div> <div style="text-align: center;">  <p>Stingray Rev. 2</p> </div> </div>

Table 4: How to remove the filter/protection glass

Not all camera types have the design to remove the filter/protection glass. See Chapter [Changing filters safety instructions](#) on page 12.

Note



- Taking out the filter requires special care.
- Ask your dealer to help you if you are not confident with the procedure.



Figure 4: Removing IR cut filter/protection glass using special tool (E902001)

3. If the impurity is neither on the lens nor the IR cut filter/protection glass, it is probably on the sensor.

Cleaning Instructions

Perform all cleaning operations (lenses, filter/protection glass, sensor in a **dust-free clean-room**. The optical components are very fragile so it is important to avoid touching them with your fingers or any hard material.

1. Unplug the camera from any power supply before cleaning.
2. Apply a small amount of optics cleaner (60% ethyl alcohol, 40% ether) to clean, new lens cleaning tissue.

Acceptable material includes medical-grade sterile optical cotton, or lens tissue that is chemically pure and free from silicones and other additives.

- **Do not** use cosmetic cotton.
- **Do not** use consumer eyeglass cleaning cloths pre-treated with silicon.



Figure 5: Medical-grade sterile optical cotton

The cotton or lens tissue should be moist, but not dripping. Please hold the camera away from your body to avoid falling particles like flakes from skin on the sensor. Hold the camera sensor diagonally upwards.

3. Wipe the glass surface with a spiral motion from the centre to the rim. Normally several spiral wipes are recommended. Wipe only on glass avoiding contact to metal surfaces, because microscopic dirt could be released and could cause scratches on the glass.

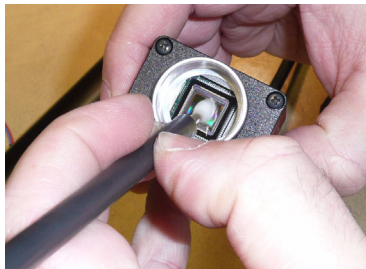


Figure 6: Sensor cleaning

4. When you've finished cleaning, examine the surface in a strong light. Take an out-of-focus picture of a flat, illuminated surface to see if any dirt or dust remains.
5. If dust spots remain, repeat this procedure using new clean lens tissue (as described above).

Caution



- Never wipe lenses with dry swabs or tissue - this causes scratches.
- Do not use any disposable cotton cosmetic swabs; they are not free from contamination.

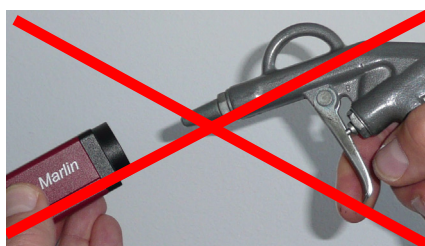


Figure 7: Don't use compressed air

6. If despite warnings you want to clean your camera with compressed air:

Caution



- Use an air blower/compressed air only if you are familiar with cleaning a camera with this instrument.
- **Compressed air may push dust into cameras and lenses.** Therefore keep the pressure at a moderate strength only:
 - The pressure at the tube should be less than 1 bar
 - operating distance: 5-30 cm

7. Please gently blow the impurities off with dust-filtered, oil-free air (< 1 bar). Using ionized air will help to remove any dirt stuck to the optical component because of static electricity.

Note

If dust spots remain after cleaning twice, please contact your AVT dealer.



AVT cameras: installing hardware

This chapter describes the **hardware installation** of 1394a/b AVT cameras, 1394 adapters (PC or laptop) and the necessary cabling.

Note For **software/driver installation** read the documentation of the AVT SoftwarePackages.



If you connect an AVT camera to your PC/laptop (before software/driver installation), the following window will appear:



Figure 8: Window: Found New Hardware Wizard

You have two choices:

- If you want to use an **AVT SoftwarePackage**, click **Cancel** to close the window. The necessary AVT driver will be installed during AVT SoftwarePackage installation process.
- If you want to use your **own image processing software**, ask your image processing vendor what to do now.

Hardware conditions

- AVT IEEE 1394a or 1394b camera (1394a: Dolphin, Oscar, Marlin, Guppy; 1394b: Pike, Stingray) with corresponding lens
- 1394 cable (4.5 m)
- PC or laptop with built-in IEEE 1394 interface
- IEEE 1394 adapter (OHCI) card for PCI bus or PCI Express bus or PC card or ExpressCard with IEEE 1394 port(s)

Note

AVT offers a wide range of IEEE 1394 adapters, both 1394a or 1394b for different requirements.



www

For **more information on accessories** go to:

www.alliedvisiontec.com/avt-products/accessories.html



To **order accessories online** visit the **AVT web shop** at:

<http://shop.avt-cameras.com/avtshop.html>

FireWire hot-plug and screw-lock precautions

Caution



Hot-plug precautions

- Although FireWire devices can **theoretically** be hot-plugged without powering down equipment, **we strongly recommend turning the computer power off, before connecting a digital camera** to it via a FireWire cable.
- **Static electricity or slight plug misalignment during insertion may short-circuit and damage components.**
- The physical ports **may be damaged** by **excessive ESD** (electrostatic discharge), when connected under powered conditions. It is good practice to ensure proper grounding of computer case and camera case to the same ground potential, before plugging the camera cable into the port of the computer. This ensures that no excessive difference of electrical potential exists between computer and camera.

Screw-lock precautions

- Also, all AVT 1394b camera and cables have **industrial screw-lock fasteners**, to insure a tight electrical connection that is resistant to vibration and gravity.
- **We strongly recommend using only 1394b adapter cards with screw-locks.**

FireWire cable	Description	Ordering number
FireWire cable -2x Interlock	IEEE 1394a; (2x Interlock) 4.5 m with Ferrites, for Marlin / Oscar / Guppy	K1200064
FireWire cable -2x Interlock	IEEE 1394a; (2x Interlock) 10 m with Ferrites, for Marlin / Oscar / Guppy	K1200163
FireWire cable -2x Interlock	IEEE 1394a; (2x Interlock) 12.5 m with Ferrites, for Marlin / Oscar / Guppy	K1200165
FireWire cable -2x Interlock	IEEE 1394a; (2x Interlock) 17.5 m with Ferrites, for Marlin / Oscar / Guppy	K1200162
FireWire cable -1x Interlock	IEEE 1394a; (1x Interlock) 3.0 m, for Marlin / Oscar / Guppy	K1200167
FireWire cable -1x Interlock	IEEE 1394a; (1x Interlock) 4.5 m, for Marlin / Oscar / Guppy	K1200091
FireWire cable -1x Interlock	IEEE 1394a; (1x Interlock) 6.0 m, for Marlin / Oscar / Guppy	K1200160

Table 5: 1394 locking cables

FireWire cable	Description	Ordering number
FireWire cable -1x Interlock	IEEE 1394a; (1x Interlock) 10 m, for Marlin / Oscar / Guppy	K1200159
Cable 0.5 m 9 pin - 6 pin, industrial	IEEE 1394b/a; 9 pin (screw lock)/6 pin (latch), 0.5 m	K1200198
Cable 4.5 m 9 pin - 6 pin, industrial	IEEE 1394b/a; 9 pin (screw lock)/6 pin (latch), 4.5 m	K1200171
Cable 0.5 m 9-pin - 9-pin, industrial	IEEE 1394b; 2x screw lock, 0.5 m, black, 2x ferrite	K1200201
Cable 5.0 m 9-pin - 9-pin, industrial	IEEE 1394b; 2x screw lock, 5.0 m, black, 2x ferrite	K1200133
Cable 7.5 m 9-pin - 9 pin, industrial	IEEE 1394b; 2x screw lock, 7.5 m, black, 2x ferrite	K1200134

Table 5: 1394 locking cables

Overview hardware installation

- Install IEEE 1394 adapter (if PC or laptop does not have an IEEE 1394 port)
- Install software (FirePackage/Fire4Linux incl. viewer) and start the viewer: see **FirePackage/Fire4Linux User Guide**
- Connect camera to PC or laptop and ensure that the camera is powered

Note



Read the software manuals (**FirePackage/Fire4Linux User Guide**) to get information on licensing, acquiring your first image with viewer and troubleshooting.

Installing IEEE 1394 adapter

1. **PC:** Install the IEEE 1394 adapter according to the instructions you got from your adapter manufacturer.
Laptop: Insert the IEEE 1394 PC Card into your laptop. Connect external power supply to the adapter to power the camera or power the camera via Hirose connector.
2. Windows 2000/XP/VISTA will detect the hardware automatically and installs a Windows 1394 driver.

Windows NT4 requires that you install the driver manually via a service install tool.

Connecting camera to PC or laptop

1. Shut down your PC or laptop and **turn computer power off**.

Caution



- **Do not touch the shield of the camera cable** connected to a computer and the ground terminal of the lines at the same time.
- **Use only DC power supplies with insulated cases.** These are identified by having only **two** power connectors.
- If you feel uncomfortable with the previous advice or if you have no knowledge about the connectivity of an installation, **we strongly recommend powering down all systems before connecting or disconnecting a camera.**

Caution



Hot-plug precautions

- Although FireWire devices can **theoretically** be hot-plugged without powering down equipment, **we strongly recommend turning the computer power off, before connecting a digital camera** to it via a FireWire cable.
- **Static electricity or slight plug misalignment during insertion may short-circuit and damage components.**
- The physical ports **may be damaged** by **excessive ESD** (electrostatic discharge), when connected under powered conditions. It is good practice to ensure proper grounding of computer case and camera case to the same ground potential, before plugging the camera cable into the port of the computer. This ensures that no excessive difference of electrical potential exists between computer and camera.

Screw-lock precautions

- Also, all AVT 1394b camera and cables have **industrial screw-lock fasteners**, to insure a tight electrical connection that is resistant to vibration and gravity.
- **We strongly recommend using only 1394b adapter cards with screw-locks.**

2. Insert one end of the FireWire cable into your 1394 adapter or 1394 PC card.
3. Insert the other end of the FireWire cable into your camera.
4. Check that the camera is powered (green LED ON).

Camera interfaces

Each AVT camera has the following interfaces:

- The 12-pin camera I/O connector (Guppy: 8-pin) provides different control inputs and output lines.
- One or two IEEE 1394a or 1394b connectors with screw lock mechanism provide access to the IEEE 1394 bus and thus makes it possible to control the camera and output frames.
 - DOLPHIN, OSCAR, MARLIN AND GUPPY provide one 1394a connector
 - PIKE and STINGRAY provide 2x 1394b connectors.

Note For information on **status LEDs** see the **Technical Manuals**.

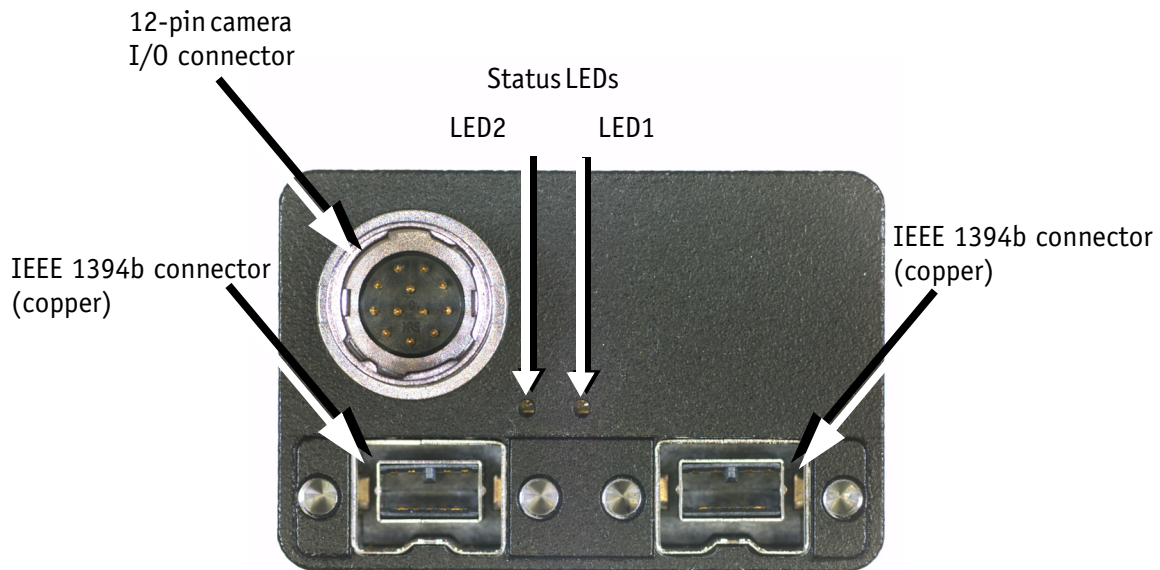


Figure 9: Example: Rear view of STINGRAY camera (2x 1394b copper)

DOLPHIN	OSCAR	MARLIN
 <p data-bbox="261 808 521 837">HIROSE and 1x 1394a</p>	 <p data-bbox="668 808 928 837">HIROSE and 1x 1394a</p>	 <p data-bbox="1067 808 1327 837">HIROSE and 1x 1394a</p>
GUPPY	PIKE	STINGRAY
 <p data-bbox="261 1379 521 1408">HIROSE and 1x 1394a</p>	 <p data-bbox="668 1379 928 1408">HIROSE and 2x 1394b</p>	 <p data-bbox="1067 1379 1327 1408">HIROSE and 2x 1394b</p>

Table 6: Rear view of AVT cameras (HIROSE and 1394 copper)

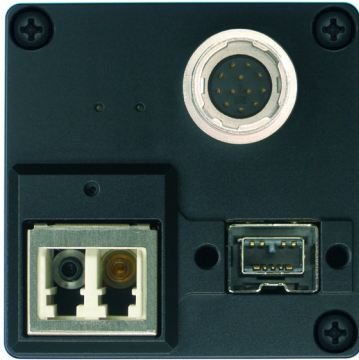
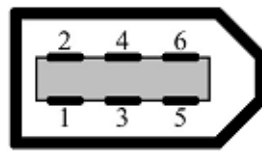
PIKE fiber	STINGRAY fiber	
 <p data-bbox="231 806 550 884">HIROSE and 1x 1394b GOF, 1x 1394b copper</p>	[tbd]	

Table 7: Rear view of AVT cameras (HIROSE and 1394b GOF/copper)

IEEE 1394a port pin assignment (DOLPHIN, OSCAR, MARLIN, GUPPY)

The IEEE 1394a plug is designed for industrial use and has the following pin assignment as per specification:



Pin	Signal
1	Cable power
2	Cable GND
3	TPB-
4	TPB+
5	TPA-
6	TPA+

Figure 10: IEEE 1394a connector

Note



Cables with latching connectors on one or both sides can be used and are available with various lengths of 4.5 m or up to 17.5 m. Ask your local dealer for more details.

Board level camera: IEEE 1394a port pin assignment

Board level Guppies have two 1394a ports to allow daisy chaining of cameras. The second IEEE 1394a pin header (2.54 mm connector) is designed for adding a 1394a adapter cable of e.g the following supplier:

<http://www.frontx.com/>

IEEE 1394 6 PIN - PANEL F TO 2X5 F (AVT#: K1200155)

It has the following pin assignment:

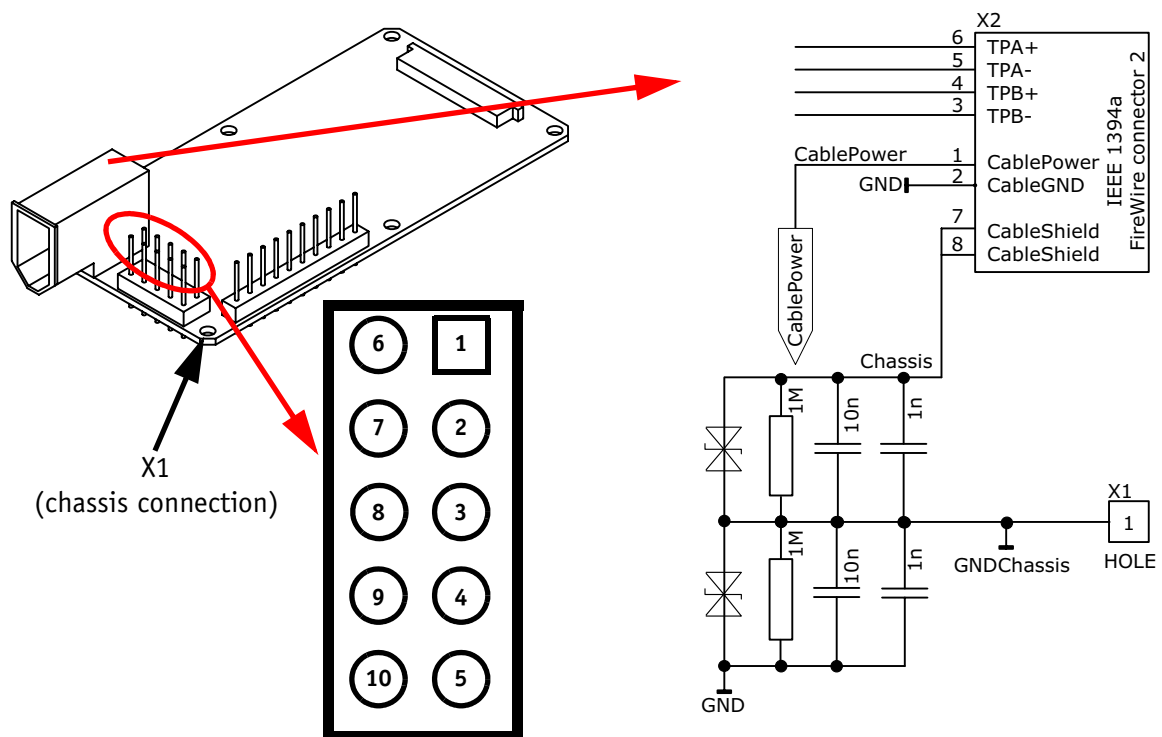


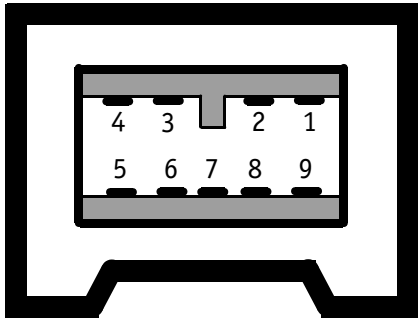
Figure 11: Board level camera: IEEE 1394 FireWire connector 1 (view on pins)

Signal	Pin	Pin	Signal
TPA+	6	1	TPA-
-	7	2	GND
TPB+	8	3	TPB-
-	9	4	Cable power
-	10	5	Cable shield

Table 8: Board level camera: IEEE 1394a pin assignment (FireWire connector 1)

IEEE 1394b port pin assignment (PIKE, STINGRAY)

The IEEE 1394b connector is designed for industrial use and has the following pin assignment as per specification:



Pin	Signal
1	TPB-
2	TPB+
3	TPA-
4	TPA+
5	TPA (Reference ground)
6	VG (GND)
7	N.C.
8	VP (Power, VCC)
9	TPB (Reference ground)

Figure 12: IEEE 1394b connector

Note



- Both IEEE 1394b connectors with screw lock mechanism provide access to the IEEE 1394 bus and thus makes it possible to control the camera and output frames. Connect the camera by using either of the connectors. The other connector can be used to daisy chain a second camera.
- Cables with latching connectors on one or both sides can be used and are available with lengths of 5 m or 7.5 m. Ask your local dealer for more details.

PIKE/STINGRAY fiber infos and cautions

All PIKE and STINGRAY cameras are also available as **fiber version** with **1 x GOF connector and 1x copper connector**.

The GOF connector is of the following type: **2 x optical fiber on LCLC**

The GOF transmission uses **MMF (multi-mode fiber at 850 nm)**.

Connect the camera by using either of the connectors. The other connector can be used to daisy chain a second camera. In case of long distances between PC and camera, use the GOF connector for the long distance and the IEEE 1394b connector for optional daisy-chaining. Please ensure that you use a GOF hub on the PC side for reconversion from GOF to copper (order number E3000074 (with mounting plate) or E3000084 (with top-hat rail)). Alternatively use PCI or PCIExpress cards with built in GOF port. Ask your dealer for availability and details of these cards.

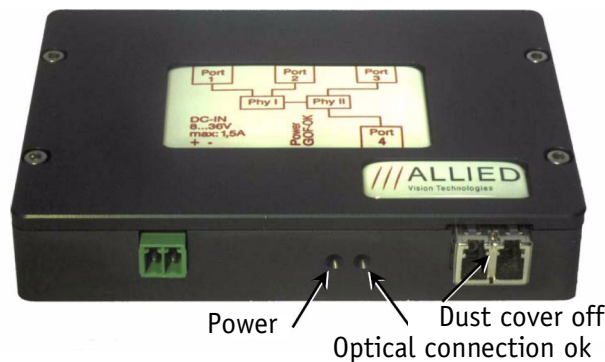


Figure 13: GOF hub

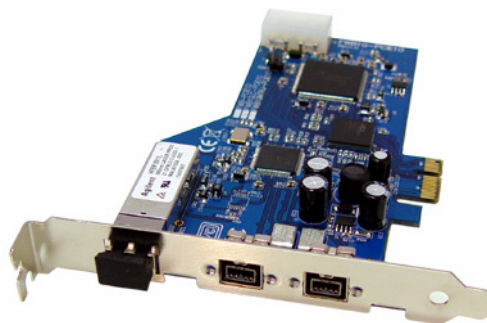


Figure 14: PCI Express card (1 x GOF, 2 x 1394 bilingual)

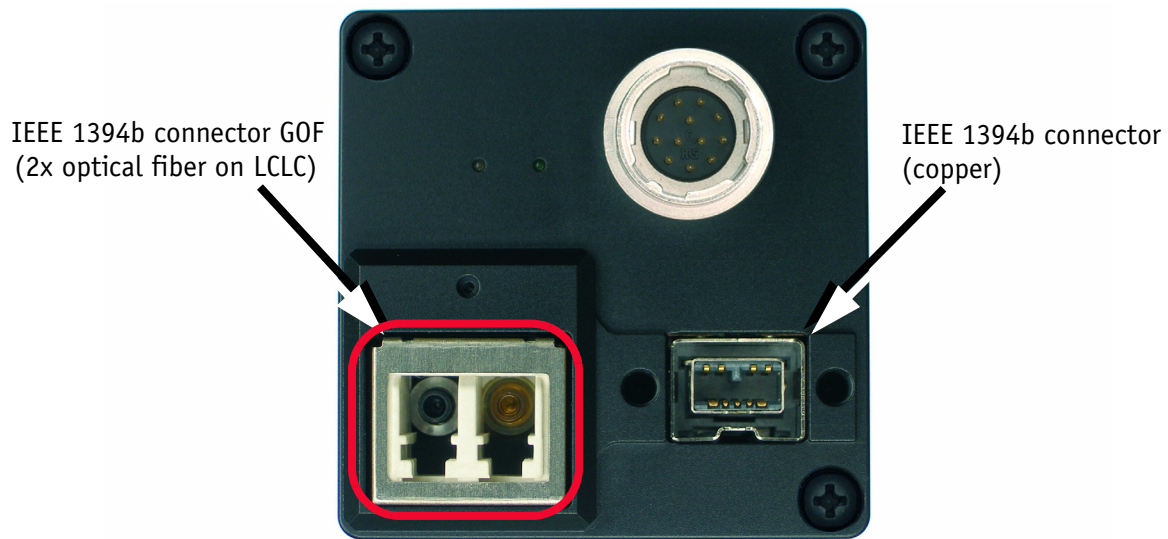


Figure 15: Rear view of PIKE camera (1394b: 1 x GOF, 1 x copper) (STINGRAY similar)

Caution



Special warning for all PIKE/STINGRAY models with GOF connectors:

GOF connectors are very sensitive. **Any dust or dirt may cause damage.**

- **Always keep the GOF connector and optical fiber plug clean.**
- If GOF connection is not in use, **keep GOF dust cover on the GOF connector.**
- **Reduce mating cycles to a minimum** to prevent abrasion.
- Please note that optical fiber cables have a **very limited deflection curve radius.**

Camera I/O pin assignment (8 pin) (GUPPY)

The 8-pin camera I/O connector (only Guppy cameras) is designed for industrial use.

It provides:

- access to the inputs and outputs on the camera
- a serial interface

Note



The part number of the appropriate straight I/O connector is:

- HIROSE HR25-7TP-8S, AVT article number K7600503

AVT also supplies various I/O cables of different lengths, a selection is listed below:

I/O cable, open 8-pin HIROSE female to open end, 2.0 m E1000842

I/O cable, open 8-pin HIROSE female to open end, 5 m E1000843

The following diagram shows the pinning of the I/O connectors as viewed in pin direction.

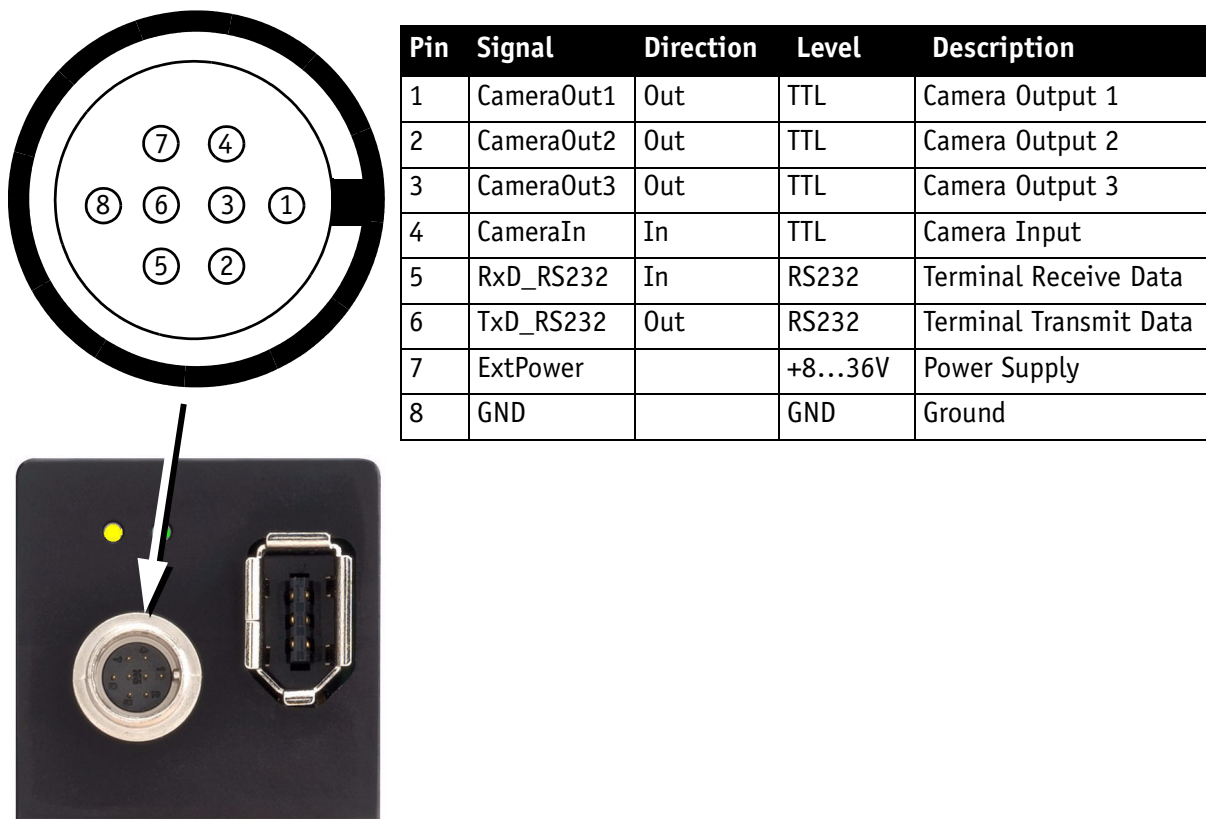


Figure 16: Camera I/O connector pin assignment (GUPPY)

Board level camera (Guppy): I/O pin assignment

The following diagram shows the I/O pin header (2.54 mm connector) of a board level camera as viewed in pin direction:

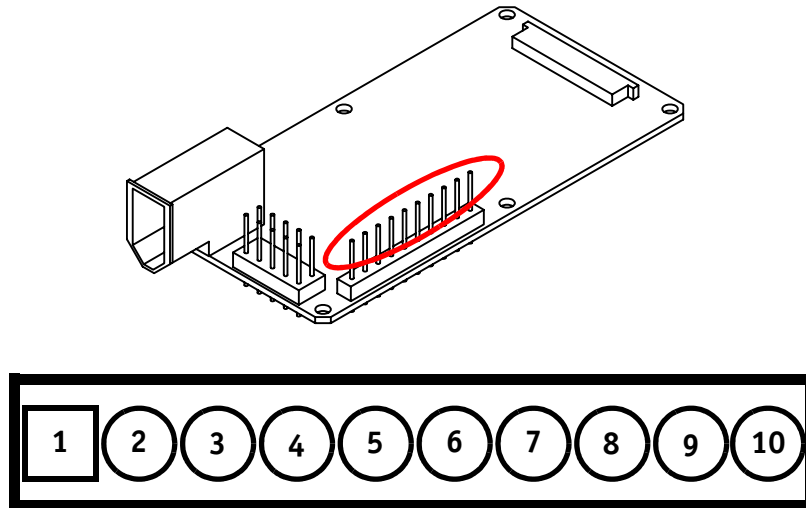


Figure 17: Board level camera: I/O pin assignment (view on pins)

Pin	Signal	Direction	Level	Description	
1	GND		GND	Ground	Power
2	ExtPower		+8 ... 36V	Power Supply	
3	GND		GND	Ground	RS232
4	TxD_RS232	Out	RS232	Terminal Transmit Data	
5	RxD_RS232	In	RS232	Terminal Receive Data	
6	GND		GND	Ground	4 x I/O
7	UserInOut4	In/Out	TTL	User Input/Output 4	
8	UserInOut3	In/Out	TTL	User Input/Output 3	
9	UserInOut2	In/Out	TTL	User Input/Output 2	
10	UserInOut1	In/Out	TTL	User Input/Output 1	

Table 9: Board level camera: Camera I/O pin assignment

Camera I/O connector pin assignment (12 pin): DOLPHIN, OSCAR, MARLIN, PIKE, STINGRAY

The 12-pin camera I/O connector (DOLPHIN, OSCAR, MARLIN, PIKE, STINGRAY) is also designed for industrial use and, in addition to providing access to the inputs and outputs on the camera, it also provides a serial interface for e.g. the firmware update.

The connector is available in straight and angled version under the following numbers:

Order text	Order number
PC-12P 12-Pin HR10A-10P-12S cable connector female	K7600040
PC-12PW 12-Pin HR10A-10LT-12S angled cable connector female	K7600044

Table 10: Order numbers: I/O connector

Note AVT supplies suitable I/O cables of different lengths (up to 10 m) as shown below.



Order text	Length	Order number
Trigger cable 12-pin HIROSE female to BNC	2.0 m	E1000648
Trigger cable 12-pin HIROSE female to BNC	5.0 m	E1000772
Trigger cable 12-pin HIROSE female to open end	2.0 m	E1000728
Trigger cable 12-pin HIROSE female to open end	10.0 m	E1000736
I/O cable 12-pin HIROSE female to open end	2.0 m	K1200191
I/O cable 12-pin HIROSE female to open end	3.0 m	K1200192

Table 11: Order numbers: trigger and I/O cables

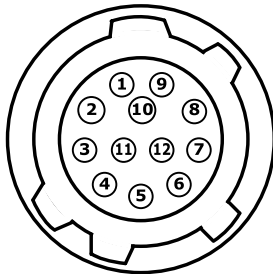
Order text	Length	Order number
I/O cable 12-pin HIROSE female to open end	5.0 m	K1200193
I/O cable 12-pin HIROSE female to open end	10.0 m	K1200194

Table 11: Order numbers: trigger and I/O cables

Note The following diagrams show the pinning of the I/O connectors as viewed in pin direction.



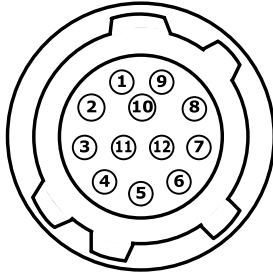
DOLPHIN family



Pin	Signal	Use
1	External GND	GND for RS232 and ext. power
2	Power IN	8-36 V DC
3	GPInput 3	TTL
4	GPInput 1 (default trigger)	TTL, Edge, progr.
5	GPOutput3	Open collector
6	GP Output 1 (default IntEna)	Open collector
7	GPInput GND	Common GND for inputs
8	RS232 RxD	
9	RS232 TxD	
10	GPOutput GND	Common VCC for outputs
11	GPInput 2	TTL
12	GPOutput 2	Open collector

Figure 18: Camera I/O connector pin assignment

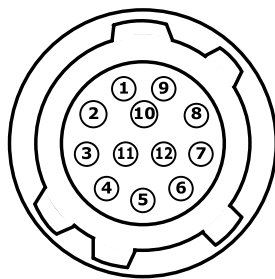
OSCAR and MARLIN family



Pin	Signal	Use
1	External GND	GND for RS232 and ext. power
2	Power IN (MARLIN: CCD models only)	
3		
4	GPIInput 1 (default trigger)	TTL, Edge, progr.
5		
6	GP Output 1 (default IntEna)	Open emitter
7	GPIInput GND	Common GND for inputs
8	RS232 RxD	
9	RS232 TxD	
10	OutVCC	Common VCC for outputs
11	GPIInput 2	TTL
12	GPOutput 2	Open emitter

Figure 19: Camera I/O connector pin assignment

PIKE and STINGRAY family



Pin	Signal	Direction	Level	Description
1	External GND		GND for RS232 and ext. power	External Ground for RS232 and external power
2	ExtPower		+8...+36 V DC	Power Supply
3	CameraOut4	Out	Open emitter	Camera Output 4 (GPOut4) default: -
4	CameraIn1	In	CMOS / TTL 8-36 V	Camera Input 1 (GPIn1) default: Trigger
5	CameraOut3	Out	Open emitter	Camera Output 3 (GPOut3) default: Busy
6	CameraOut1	Out	Open emitter	Camera Output 1 (GPOut1) default: IntEna
7	CameraIn GND	In	Common GND for inputs	Camera Common Input Ground (In GND)
8	RxD_RS232	In	RS232	Terminal Receive Data
9	TxD_RS232	Out	RS232	Terminal Transmit Data
10	CameraOutPower	In	Common VCC for outputs max. 35 V DC	Camera Output Power for digital outputs (OutVCC)
11	CameraIn2	In	CMOS/TTL 8-36 V	Camera Input 2 (GPIn2) default: -
12	CameraOut2	Out	Open emitter	Camera Output 2 (GPOut2) default: Follow CameraIn2

Figure 20: Camera I/O connector pin assignment

Note GP = General Purpose



Note Pin 1 is **not** internally bridged with pin 7 to avoid ground noise being induced in the camera and to prevent ground loops. Use pin 1 only if you want to power the camera by HIROSE or to connect to the serial interface of the camera in combination with pin 8 and 9.



Operating the camera (DOLPHIN, OSCAR, MARLIN, GUPPY, PIKE, STINGRAY)

DOLPHIN, OSCAR, MARLIN, PIKE, STINGRAY

Power for the camera is supplied either via the FireWire™ bus or the camera I/O connector's pin 2 (MARLIN: CCD models only).

GUPPY

Power for the camera is supplied either via the FireWire™ bus or the camera I/O connector's pin 7.

ALL CAMERAS

The input voltage must be within the following range:

Vcc min.: +8 V

Vcc max.: +36 V

Note

ALL CAMERAS



- An input voltage of 12 V is recommended for most efficient use of the camera.
- As mentioned above (MARLIN: CCD models only): The camera I/O supplies power to the camera via a diode. This means that there is **no** power out at pin 2 (GUPPY: pin 7) if the camera is powered via the bus. Consult the factory if you need power output at this pin instead of power in.

Control and video data signals

DOLPHIN cameras have 3 inputs and 3 outputs

OSCAR cameras have 2 inputs and 2 outputs.

MARLIN cameras have 2 inputs and 2 outputs.

GUPPY cameras have 1 input and 3 outputs. **GUPPY board level** cameras have **4 bidirectional inputs/outputs**.

PIKE cameras have 2 inputs and 4 outputs.

STINGRAY cameras have 2 inputs and 4 outputs.

Note

ALL CAMERAS



Inputs and outputs can be configured by software. (GUPPY board level: only outputs can be disabled via registers). For a description of the different modes and the registers see the **Technical Manuals**.

Caution



GUPPY

The **GUPPY outputs** are **not short-circuit-proof**.
If there occurs a short-circuit at the outputs, the **output driver will be damaged**.

Inputs (DOLPHIN, OSCAR, MARLIN, GUPPY, PIKE, STINGRAY)

All inputs have been implemented as shown in the diagrams below.

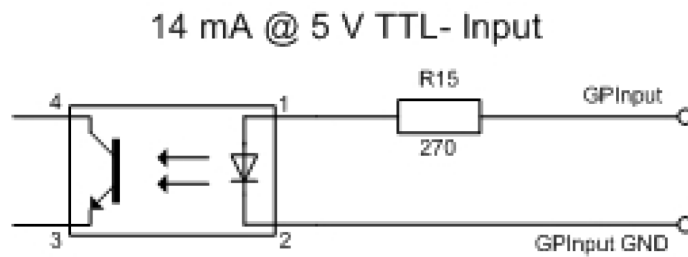


Figure 21: Input schematics (**DOLPHIN**)

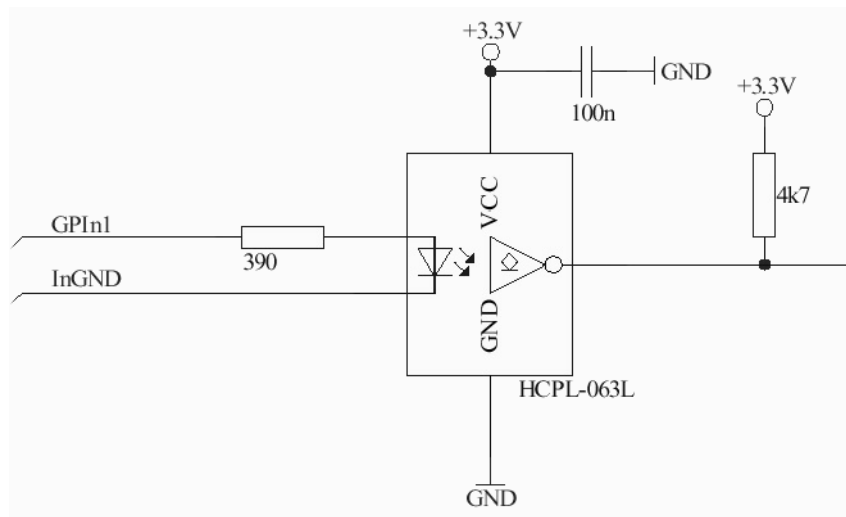


Figure 22: Input schematics (**OSCAR, MARLIN**)

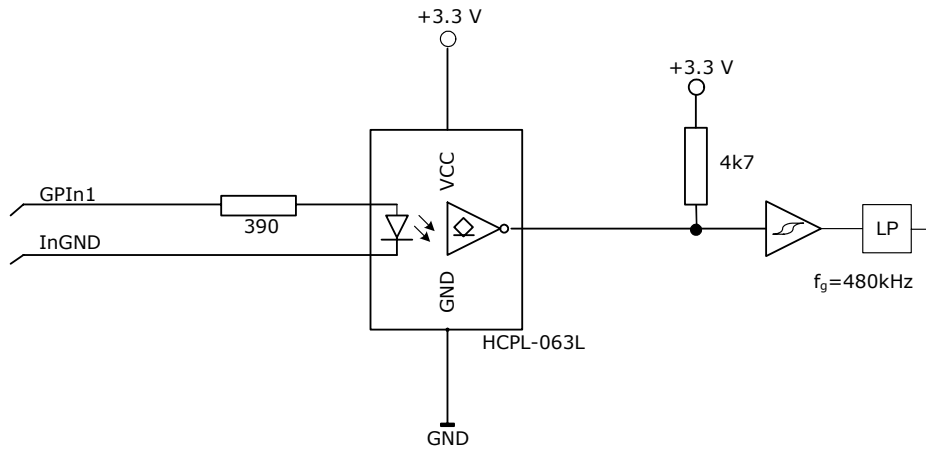


Figure 23: Input schematics (PIKE)

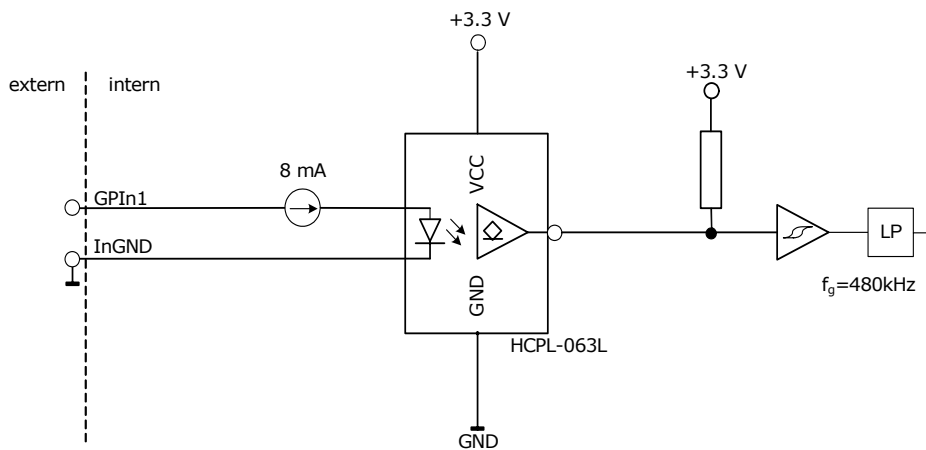


Figure 24: Input schematics (STINGRAY)

Flux voltage from LED type 1.2 V at 20 mA	
Initial on-current	5 mA
Max. off-current	1 mA
Max. input current	50 mA
Max. input frequency	2 kHz
Min. pulse width	50 μs

Table 13: Input characteristics: Flux voltage (DOLPHIN)

Flux voltage from LED type 1.5 V at 10 mA	
Initial on-current	5 mA
Max. off-current	0.25 mA
Max. input current	15 mA
Min. pulse width	2.2 μ s OSCAR: 100 μ s (software)

Table 14: Input characteristics: Flux voltage (**OSCAR, MARLIN, PIKE**)

Cycle delay of the optical coupler	
tpdLH	2275 ns
tpdHL	2290 ns

Table 15: Input characteristics: Cycle delay (**OSCAR, MARLIN, PIKE**)

	Absolute maximum ratings	Recommended operating conditions	Description
Input voltage	-0.5 V ... +7.0 V	0 V ... + 5.5 V	5 V CMOS
Input rise and fall time			Schmitt trigger implemented
Input clamping voltage	24 V		
Input pulse width (min.)		> 1 μ s	Digital input filter

Table 16: Input characteristics (**GUPPY**)

Flux voltage from LED type 1.5 V at 10 mA	
Current	8 mA (constant)
Min. pulse width	1.5 μ s

Table 17: Input characteristics: Flux voltage (**STINGRAY**)

Cycle delay of the optical coupler	
tpdLH	\leq 1 μ s
tpdHL	\leq 1 μ s

Table 18: Input characteristics: Cycle delay (**STINGRAY**)

DOLPHIN The inputs can be connected directly to +5 V. If higher voltage is used a resistor will have to be switched in series: at +12 V use a 470 Ω resistor, at +24 V use a 1.2 k Ω resistor. (**DOLPHIN**)

Caution

DOLPHIN



Voltages above +45 V may damage the optical coupler.

OSCAR The inputs can be connected directly to +5 V. If a higher voltage is used, an external resistor must be placed in series: at +12 V use a 820 Ω resistor, at +24 V use a 2.2 k Ω resistor. (**OSCAR**)

Caution

OSCAR



Voltages above +45 V may damage the optical coupler.

MARLIN The inputs can be connected directly to +5 V. If a higher voltage is used, an external resistor must be placed in series: at +12 V use a 820 Ω resistor and at +24 V use a 2.2 k Ω resistor. (**MARLIN**)

Caution

MARLIN



Voltages above +45 V may damage the optical coupler.

GUPPY The inputs can be connected directly to +5 V.

Caution

GUPPY



If using voltages higher than + 5 V the input of the camera will be damaged.

To avoid damage of the input, **use an external resistor in series (outside of the camera).**

Recommendations for resistors by voltages higher than + 5 V:

- At +12 V use a 18 k Ω resistor.
- At +24 V use a 47 k Ω resistor.

For details see [Figure 25: Input block diagram \(GUPPY\)](#) on page 51.

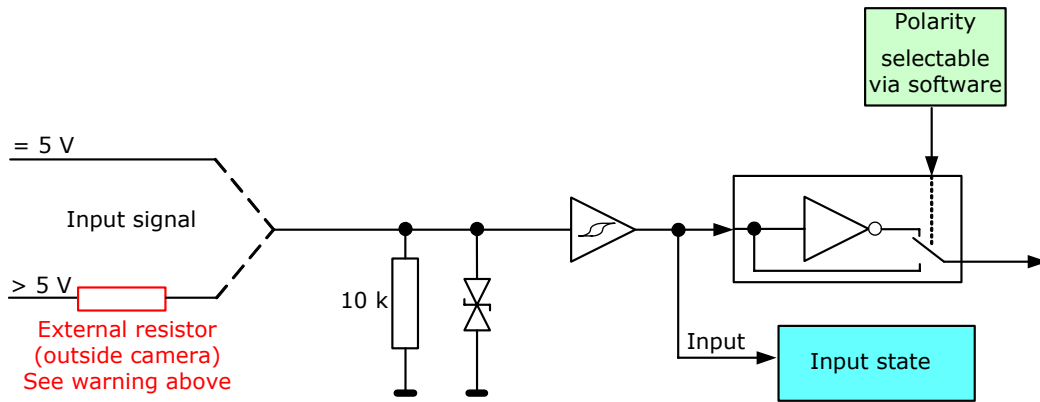


Figure 25: Input block diagram (GUPPY)

PIKE The inputs can be connected directly to +5 V. If a higher voltage is used, an external resistor must be placed in series. Use at +12 V a 820 Ω resistor and at +24 V a 2.2 kΩ resistor.

Caution



PIKE

Voltages above +45 V may damage the optical coupler.

STINGRAY The inputs can be connected directly to +3 V ... + 30 V. (**STINGRAY**)

Caution



STINGRAY

Voltages above +30 V may damage the optical coupler.

ALL CAMERAS The following note is valid for all cameras:

Note



ALL CAMERAS

For information on the **optical coupler**, **polarity** and the **IO registers** see the **Technical Manuals**.

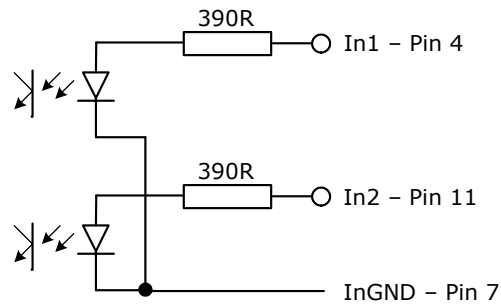


Figure 26: Input Ground (InGND) (Pin no. 7 from camera I/O connector) (**PIKE**)

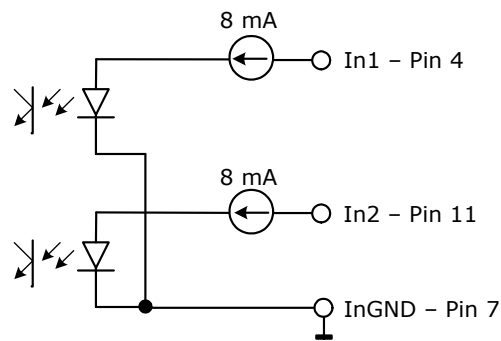


Figure 27: Input Ground (InGND) (Pin no. 7 from camera I/O connector) (**STINGRAY**)

Triggers

ALL CAMERAS The following note is valid for all cameras:

Note

ALL CAMERAS



For information on inputs configured as **triggers** see the **Technical Manuals**.

Outputs DOLPHIN

The DOLPHIN cameras have 3 inverted outputs with open collectors. These are shown with external wiring in the following diagram:

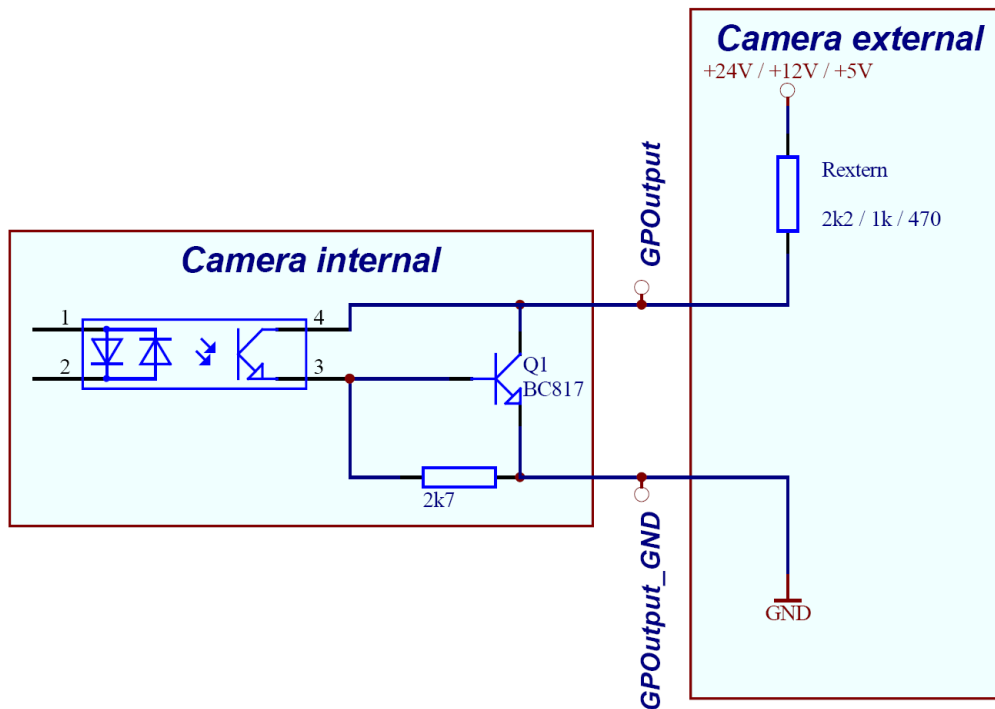


Figure 28: Output schematics with external resistor R (DOLPHIN)

Parameter	Test condition	Value
Collector voltage		Max. 500 mA
Emitter collector voltage		Max. 45 V

Figure 29: Output parameters (DOLPHIN)

OutVCC	Resistor value
5 V	470 Ω
12 V	1 kΩ
24 V	2.2 kΩ

Figure 30: OutVCC (DOLPHIN)

Note



DOLPHIN

- Voltage above +45 V may damage the circuit.
- Depending on the voltage applied at OutVCC and the type of input which you want to drive, it may be necessary to switch an external resistor in series. See [Figure 28: Output schematics with external resistor R \(DOLPHIN\)](#) on page 53.

Note



For information on **output features** (IntEna, Fval, Busy) and configuration via registers see **Technical Manuals**.

Outputs OSCAR/MARLIN

The OSCAR and MARLIN cameras have 2 non-inverting outputs with open emitters. These are shown in the following diagram:

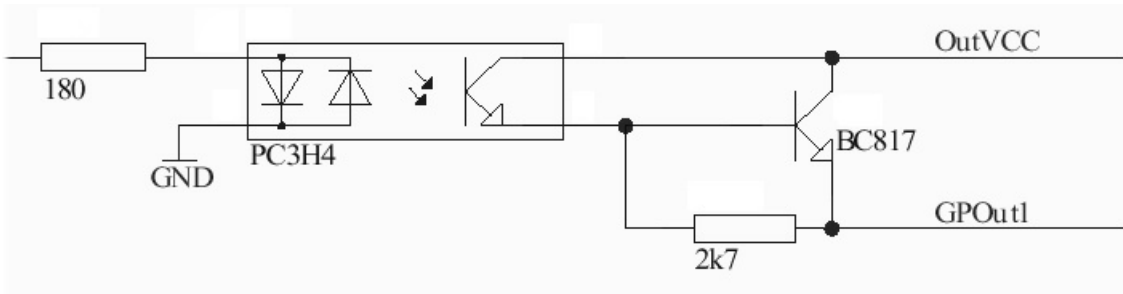


Figure 31: Output schematics with external resistor R (OSCAR/MARLIN)

Parameter	Test condition	Value
Emitter current		Max. 500 mA
Emitter collector voltage		Max. 45 V

Figure 32: Output parameters (OSCAR/MARLIN)

OutVCC	Resistor value
5 V	1 kΩ
12 V	2.4 kΩ

Figure 33: OutVCC (OSCAR/MARLIN)

Note OSCAR/MARLIN



- Voltage above +45 V may damage the optical coupler.
- The output connection is different to the AVT Dolphin series to achieve higher output swing.
- Depending on the voltage applied at OutVCC and the type of input which you want to drive, it may be necessary to switch an external resistor in series between GPOut1 and ground. The use of 1 kΩ @ 5 V or 2.4 kΩ @ 12 V can be recommended. Typical delay is not more than 40 μs.

Note



For information on **output features** (IntEna, Fval, Busy) and configuration via registers see **Technical Manuals**.

Outputs GUPPY

The standard Guppy cameras have 3 inverting outputs.

Outputs	Operating conditions
Output voltage	0 ... 5.5 V
Output current	Max. \pm 20 mA

Table 19: Output parameters (**GUPPY**)

Note



For information on **output features** (IntEna, Fval, Busy) and configuration via registers see **Technical Manuals**.

Guppy **board level** cameras have physically 4 I/Os and logically **4 inputs and 4 outputs**. For information on I/Os and PWM of board level cameras see **Technical Manuals**.

Outputs PIKE

The PIKE cameras have 4 non-inverting outputs with open emitters. These are shown in the following diagram:

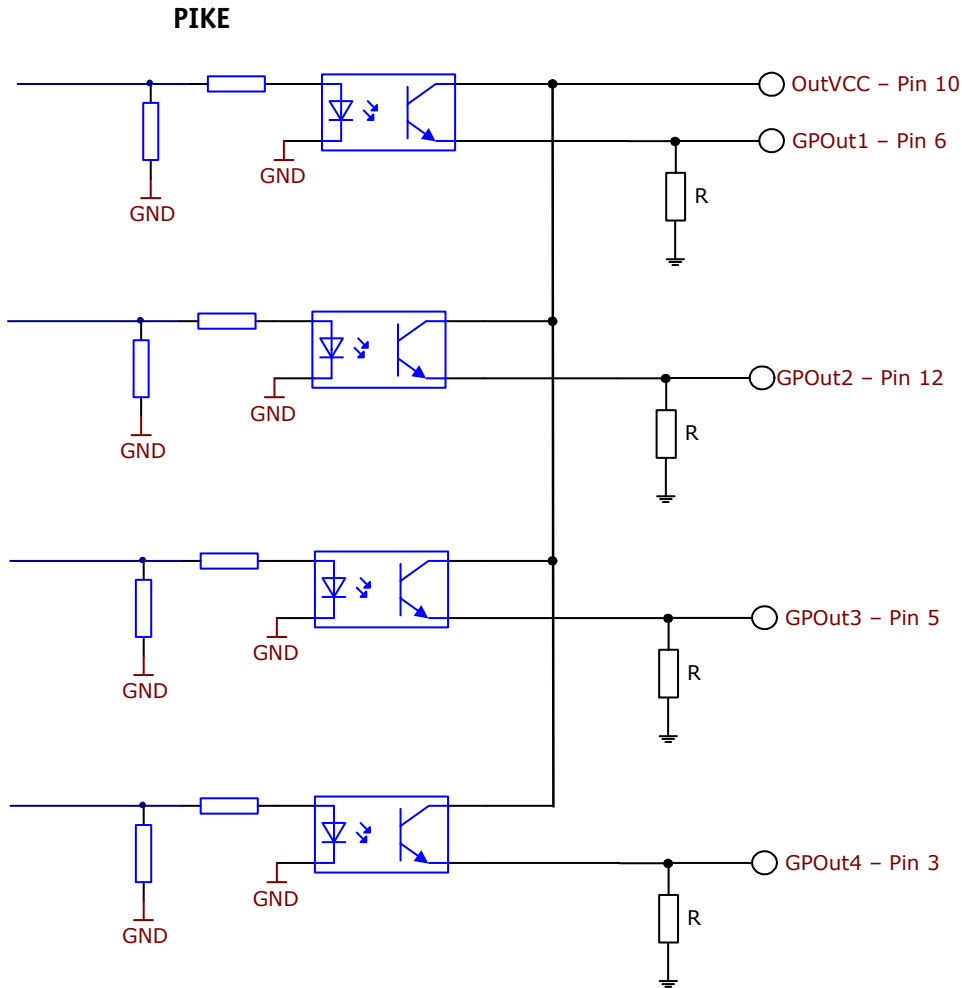


Figure 34: Output schematics with external resistors R (pin no. from camera I/O connector) (PIKE)

Parameter	Test condition	Value
Collector emitter voltage		Max. 35 V
Emitter collector voltage		Max. 7 V
Emitter current		Max. 50 mA
Collector current		Max. 80 mA
Collector peak current	$t_p/T=0.5$ $t_p \leq 10\text{ms}$	100 mA
Power dissipation		150 mW

Figure 35: Output parameters (PIKE)

OutVCC	Resistor value
5 V	1 kΩ
12 V	2.4 kΩ
24 V	4.7 kΩ

Figure 36: OutVCC (PIKE)

Note **PIKE**



- Voltage above +45 V may damage the optical coupler.
- The output connection is different to the AVT Dolphin series to achieve higher output swing.
- Depending on the voltage applied at OutVCC and the type of input which you want to drive, it may be necessary to switch an external resistor in series between GPOut1...4 and ground. See [Figure 34: Output schematics with external resistors R \(pin no. from camera I/O connector\) \(PIKE\)](#) on page 57.
- Typical delay is not more than 40 μs.

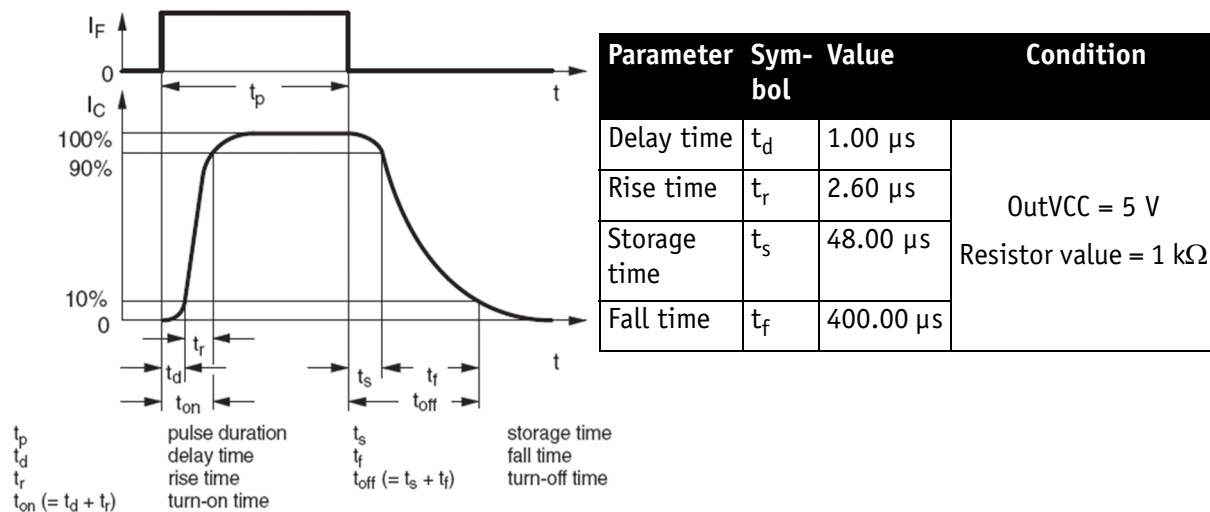


Figure 37: Output schematics: switching times (PIKE)

Note For information on **output features** (IntEna, Fval, Busy) and configuration via registers see **Technical Manuals**.



Outputs STINGRAY

The STINGRAY cameras have 4 non-inverting outputs with open emitters. These are shown in the following diagram:

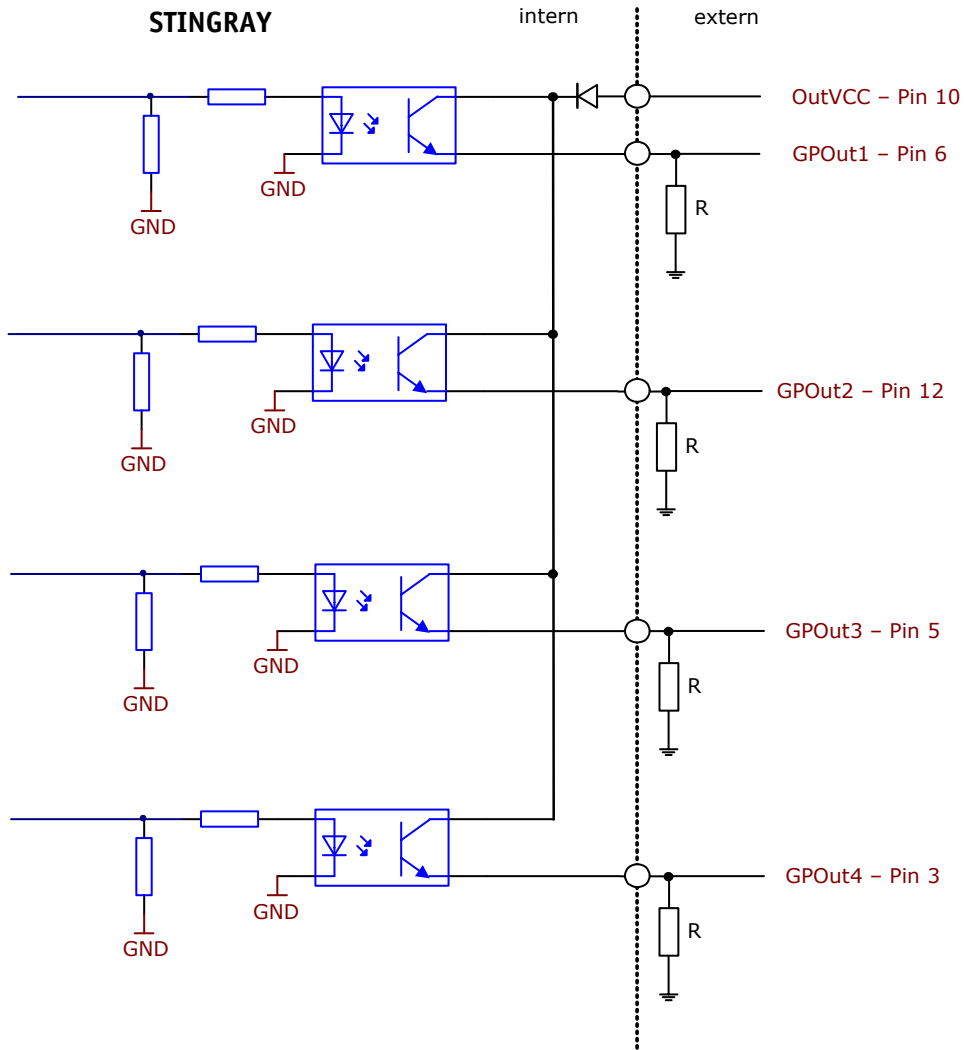


Figure 38: Output schematics with external resistors R (pin no. from camera I/O connector) (STINGRAY)

Parameter	Test condition	Value
Collector emitter voltage		Max. 30 V
Emitter collector voltage		Max. 5 V
Collector current		Max. 50 mA
Collector power dissipation		100 mW

Figure 39: Output parameters (STINGRAY)

OutVCC	Resistor value	
5 V	1 kΩ	≈ 5 mA load
12 V	2.4 kΩ	
24 V	4.7 kΩ	

Figure 40: OutVCC (STINGRAY)

Note

STINGRAY



- Voltage above +30 V may damage the optical coupler.
- The output connection is different to the AVT Marlin series to achieve higher output swing.
- Depending on the voltage applied at OutVCC and the type of input which you want to drive, it may be necessary to switch an external resistor in series between GPOut1...4 and ground. See [Figure 38: Output schematics with external resistors R \(pin no. from camera I/O connector\) \(STINGRAY\)](#) on page 59.
- Typical delay is not more than 40 μs.

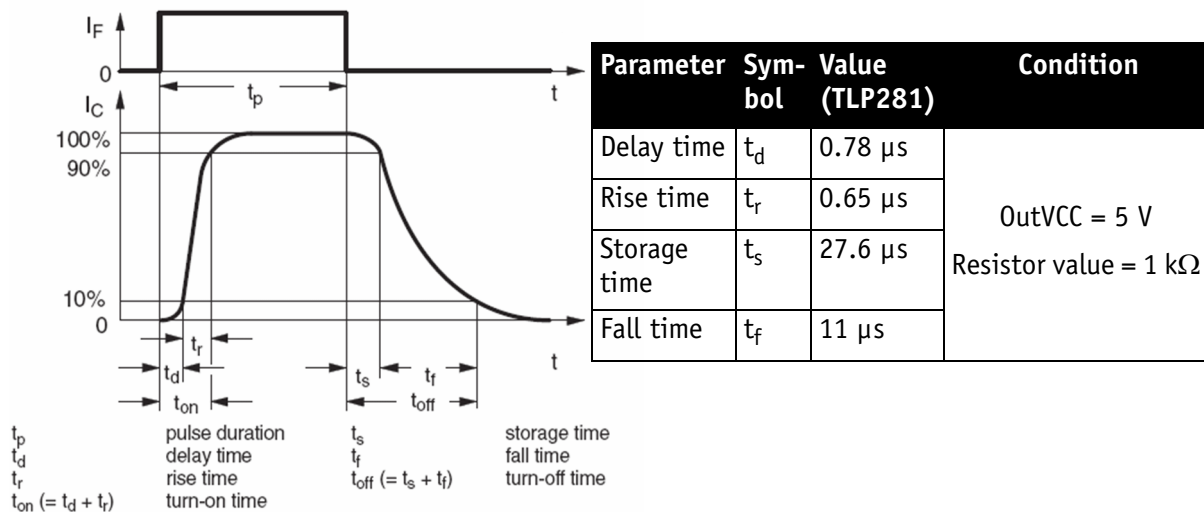


Figure 41: Output schematics: switching times (STINGRAY)

Note

For information on **output features** (IntEna, Fval, Busy) and configuration via registers see **Technical Manuals**.



Firmware update

Firmware updates can be carried out without opening the camera.

Note



For further information:

- Read the application note: **How to update Guppy/Pike/Stingray firmware** at AVT website or
- Contact your local dealer.

Index

C

Cable GND	35
camera	
I/O pinning	41
operating	46
rear view	32
camera interfaces.....	32
common GND	
inputs.....	43, 44, 45
common vcc	
outputs.....	43, 44, 45
Cycle delay	
input characteristics	49
optical coupler.....	49
cycle delay	
input characteristics	49
optical coupler.....	49

D

document history.....	6
-----------------------	---

E

emitter.....	55, 57, 59
External GND	43, 44, 45

F

FirePackage	
hardware conditions	28
operating system.....	30
overview	30
FireWire™ bus.....	46
firmware update	61
Flux voltage	
input characteristics	48, 49
LED	48, 49

G

GND for RS232	43, 44, 45
GP Output 1	43, 44
GPIInput.....	43, 44
GPIInput 2	43, 44

GPIInput GND	43, 44
GPOutput 2	43, 44

H

hardware conditions	
FirePackage	28
HIROSE.....	40
pinning.....	44

I

IEEE 1394 adapter	
installing	30
IEEE 1394 connector	35
IEEE 1394 port	
pin assignment	35
IEEE 1394b connector.....	32, 37
input	
characteristics	48, 49
max. current.....	48, 49
type	54, 55, 58, 60
input characteristics	
Cycle delay	49
cycle delay	49
input voltage	46
inputs	32, 40, 42
common GND	43, 44, 45
general.....	46
in detail.....	47
voltage	15, 16, 50, 51
installing	
IEEE 1394 adapter	30
IntEna.....	43, 44, 45
I/O pinning	41

L

latching connectors.....	35, 37
LED	
current	48, 49
flux voltage.....	48, 49
Legal notice	2

O

Open emitter	43, 44
operating	
camera.....	46
operating system	
FirePackage	30
optical coupler	
cycle delay	49
optical filter.....	11
outputs	40, 42, 57
common vcc	43, 44, 45
general	46
non-inverting	55, 56, 57, 59
OutVCC	44, 45
overview	
FirePackage	30

P

Power	
IEEE 1394b.....	37
power	
cable	11
connectors	14, 31
DC.....	14, 31
GND.....	43, 44, 45
IEEE-1394 pin assignment	35, 36
power down	14, 31
Power IN	43, 44

R

rear view of camera	32
Reference documents	
USA.....	14
RS232	45
RS232 RxD	43, 44
RS232 TxD	43, 44
RxD_RS232.....	45

S

safety instructions	11
SmartView	
starting	31
starting	
SmartView	31
styles	7
symbols.....	7, 8

T

TPA-	35, 36
IEEE 1394b.....	37
TPA(R)	
IEEE 1394b.....	37
TPA+	35, 36, 37
TPB-	35, 36
IEEE-1394b.....	37
TPB(R)	
IEEE 1394b.....	37
TPB+	35, 36, 37
IEEE 1394b.....	37
trigger	
HIROSE pinning	43, 44
triggers	52

V

VCC	
IEEE 1394b.....	37
VG (GND)	
IEEE 1394b.....	37
VP	
IEEE 1394b.....	37
VP (Power, VCC)	
IEEE 1394b.....	37